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Macroeconomic policy questions: science and technology for development

Report of the Secretary-General

I. Introduction

1. In its resolution 50/101 of 20 December 1995, the General Assembly, reaffirming the continuing validity of the Vienna Programme of Action on Science and Technology for Development and recognizing that information technologies are important requisites for planning, development and decision-making in science and technology as well as their implications for society, reaffirmed that capacity-building in science and technology in developing countries should remain a priority issue in the United Nations agenda; stressed the importance for developing countries to adopt and implement their own science and technology policies that support the national effort to achieve sustained economic growth and sustainable development in the light of their respective national conditions, needs, priorities and objectives; also stressed the need to strengthen the important role of the United Nations in the field of science and technology, particularly through effective cooperation in technology assessment, monitoring and forecasting; recognized the role of the private sector in science and technology for development, in particular in the transfer and development of technology capabilities; also recognized the role of Governments, in particular in providing appropriate regulatory frameworks and incentives for the development of science and technology capabilities; and noted the endorsement by the Economic and Social Council of the decision of the Commission on Science and Technology for Development to select information technologies as the substantive theme for the inter-sessional period 1995-1997.

2. The General Assembly took note of the decision of the Economic and Social Council to invite the Commission on Science and Technology for Development to consider ways and means for the formulation of a common vision regarding the future contribution of science and technology for development; reaffirmed the need for Governments and regional and international bodies to take measures to ensure that women have equal access to and equal opportunity to participate in the scientific and technological areas; called upon the Commission on Science and Technology for Development and the Commission on Sustainable Development to interact more effectively, through the Economic and Social Council, in carrying out their respective mandates; called upon supporting secretariats of the two Commissions to improve their interaction; and requested the Secretary-General to submit a report to it at its fifty-second session on progress in the implementation of the resolution.

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II. Implementation of science and technology for development aspects of resolution 50/101

3. The present report, prepared pursuant to the General Assembly resolution 50/101, covers the activities falling within the mandates of the Commission on Science and Technology for Development and its supporting secretariat, the United Nations Conference on Trade and Development (UNCTAD). The main strands of these activities comprise work on information and communications technologies; science, technology and innovation policy reviews; gender, science and technology; the formulation of a common vision regarding the future contribution of science and technology for development; and cooperation and coordination of the science and technology related activities of the organizations of the United Nations system.

Information and communications technologies

4. The rapid advancement of information technology in recent years continues to transform the global economy through its impacts on information processing, production, management and competitiveness. These advances, in particular the low cost and miniaturization of microchips, has offered new opportunities for access to and use of information technology to tackle the problems of poverty, economic stagnation, and environmental degradation. However, access to and application of information and communications technologies and ability to exploit their development potentialities cannot be taken for granted in the case of developing countries and countries with economies in transition. The critical challenge facing most of the countries is how to access and avail themselves of the undoubted development benefits of information and communications technology notwithstanding the underdevelopment of their technological capability, skill capacity and supporting infrastructure. In embarking on that difficult course, most developing countries, in particular least developed countries, would have little previous experience to go by or proven policy guidelines to follow.

5. Responding to the needs of developing countries and countries with economies in transition to understand the complexities of the issues pertaining to information and communications technologies and to guide them in their policy actions, the Commission on Science and Technology for Development decided at its second session, in May 1995, to adopt information and communications technology as the main substantive theme for its second inter-sessional period, 1995-1997, and to address the subject at its third session, in May 1997. In that regard, the Commission established a working group on information and communications technology for the purposes of reviewing the evidence of their implications for development and making policy recommendations for the consideration of the Commission.

6. In carrying out its task, the Working Group sought inputs from and collaborated with several United Nations agencies and other institutions with competence in information and communications technology. In particular, the United Nations Conference on Trade and Development (UNCTAD), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Telecommunication Union (ITU), the United Nations University (UNU)/Institute for New Technologies, the International Development Research Centre and the Science and Policy Research Unit of the University of Sussex made significant contributions to the work of the Working Group. The Group indicated that the impact of information and communications technology on economies and societies was not as deep or pervasive as the debate about the benefits of the global information society sometimes made it appear. There were very many people, including some in developed countries, whose lives had barely been touched by those technologies. On the other hand, others had suffered unemployment or difficulties as a result of their introduction. After considering the potential, including the negative, impacts of information and communications technologies and the likely future trajectory of their development, the Working Group concluded that, although the costs of building national information infrastructure were high, the costs of not doing so were likely to be much higher.

7. The Working Group has suggested guidelines that should be noted by national Governments, other stakeholders and agencies of the United Nations system. They are intended to help developing countries and countries with economies in transition design new roles for the public and business sectors so as to enable information and communications technologies to be harnessed to economic, social and environmental development goals.

8. Following its consideration of the report and recommendations of the Working Group on information and communications technology at its third session, the Commission on Science and Technology for Development called for a number of interrelated measures:

(a) Each developing country and country with an economy in transition should establish a national information

and communications technology strategy that took into account, *inter alia*, the guidelines proposed by the Working Group on Information and Communications Technologies for Development. Where such strategies already existed, they should be reviewed in the light of the guidelines;

(b) In order to facilitate the exchange of experience among them at the international and regional levels, countries should prepare a report on their information and communications technology strategies for the next session of the Commission in 1999. Reports should include the priorities of each such national strategy, the mechanisms for updating and the procedures for implementing the strategy. To enhance the value of the reports, consideration might be given to the organization of workshops;

(c) Relevant bodies of the United Nations system should assess their capability to provide assistance and promote cooperation in the area of information and communications technology and suggest areas in which they were best able to assist developing countries and countries with economies in transition in the design and implementation of their national strategies;

(d) UNCTAD, as the secretariat of the Commission, should synthesize the results of such assessments and hold, within existing resources, an inter-agency meeting in cooperation with the Commission to review the synthesis.

Science, technology and innovation policy reviews

9. Science, technology and innovation policy reviews are being undertaken by UNCTAD in collaboration with the Commission on Science and Technology for Development in response to Economic and Social Council resolution 1995/4. UNCTAD was also mandated by the Conference at its ninth session to carry out such reviews at the request of Member States. The need for reviews arose from the overall consensus that the ability of a country to sustain rapid economic growth was in the long run highly dependent on the effectiveness with which its institutions and policies supported the technological transformation and innovativeness of its enterprises. Developing countries and countries with economies in transition, whose science and technology institutions were, for the most part, fragmented, uncoordinated and poorly adapted to meeting local industry's needs, also required mechanisms enabling them to assess their performance and to exchange experiences in that domain. The science, technology and innovation policy reviews were seen as a vehicle for that purpose.

10. The science, technology and innovation policy reviews focus on the national system of innovation, a network of institutions, public and private, whose actions initiate, import, modify and diffuse new technologies. Important actors in that perspective are enterprises interacting with one another and bringing new products, processes and forms of organization into economic use. Other important players include universities, technological institutes, research and development centres, including industry associations, institutions involved in education and training and institutions responsible for the financing of innovations. In contrast to the traditional supply-oriented science and technology reviews, which adopted a more static approach by focusing on a description of science and technology institutions and their output, the science, technology and innovation policy reviews highlight the use and value of those science and technology outputs to production.

11. This first step in responding to a request from a member country for a science, technology and innovation policy review is for the Secretariat to send a brief programming mission to the country concerned in order to discuss the design and content of a background report by the participating country and to select sectors for in-depth evaluation. Once the background report is completed, an international team of experts including members of the Secretariat prepares an evaluation report containing the team's assessment of the science, technology and innovation system in the country and proposes appropriate policy options. In order to bring the policy reviews to the attention of the local community, a final round-table meeting is held in the country between the international experts, the Secretariat and key actors in the national science, technology and innovation system. The background report, as well as the review team's report, is then compiled, edited and prepared by the Secretariat for publication.

12. The first science, technology and innovation policy review to be undertaken was in Colombia. Its objectives were, *inter alia*, (a) to evaluate the efficiency of the prevailing Colombian science and technology institutions in the promotion of technological innovation, in particular in the private sector; (b) to assess the elements of the Colombian framework relevant to the national system of innovations; (c) to examine the role of policies and institutions aimed at fostering activities that lead to technical change; and (d) to promote innovative activities in enterprises of all sizes. The review highlighted the strength and weaknesses of the national system of innovation in Colombia and presented concrete systemic recommendations

for action in critical sectors of the economy by the actors concerned.

13. A second science, technology and innovation policy review is currently under way in Jamaica. Requests for reviews have also been received from Belarus, Costa Rica, Ethiopia, Lithuania, Myanmar, Romania and the United Republic of Tanzania.

Gender, science and technology

14. The importance the Commission on Science and Technology for Development attaches to the gender aspects of science and technology is apparent from the fact that it was selected, at the first session of the Commission, as one of its substantive themes for the 1993-1995 inter-sessional period. The Working Group established by the Commission to examine the gender implications of science and technology presented its findings to the Commission at its second session, in May 1995. In its report, the Working Group made two sets of recommendations, one directed at Governments and the other aimed at the organizations of the United Nations system. In addition, the report recommended the establishment of a gender advisory board for a duration of four years, funded by extrabudgetary resources, to ensure that gender issues were adequately addressed in future deliberations of the Commission and to follow the implementation of its recommendations by both Member States and the United Nations system. The Economic and Social Council endorsed those recommendations in its resolution 1995/4.

15. Following its creation, the Gender Advisory Board started work on identifying regional units in the developing countries that could support the formation and activities of national committees set up by Governments in accordance with the Economic and Social Council recommendation on gender, science and technology for development. The first unit to be established will be in Jakarta, as a joint initiative of the Indonesian Institute for Science and the UNESCO Regional Office. The second unit will be in Montevideo, in collaboration with the Centro de Informaciones y Estudios del Uruguay and the UNESCO Regional Office. A third is to be identified in Africa. It is planned to have all the regional units established and operational by early 1998.

16. The Gender Advisory Board, in cooperation with the United Nations Development Programme (UNDP)/the United Nations Development Fund for Women, organized a meeting of organizations of the United Nations system to review the recommendations adopted by the Economic and Social Council and to discuss how to proceed with their implementation. The meeting, held in New York, was attended by representatives of 18 United Nations organizations. In addition, eight representatives from non-governmental organization networks and organizations were invited to attend so as to facilitate discussions regarding working relationships between the United Nations and non-governmental organizations in this area. Among the issues discussed were the relationships between the United Nations organizations, the Gender Advisory Board and UNCTAD; the relevance of the recommendations adopted in 1995 in the light of the subsequent Plan of Action adopted at the Fourth World Conference on Women and Development; and the thematic issues to be selected by the Board for its examination. The meeting contributed significantly towards creating common understanding and perceptions on those issues and to determining how the Board should proceed in formulating actions in those areas.

Ways and means for the formulation of a common vision regarding the future contribution of science and technology for development

17. In its resolution 1994/4, the Economic and Social Council invited the Commission on Science and Technology for Development to give consideration to ways and means of taking advantage of the twentieth anniversary of the United Nations Conference on Science and Technology for Development, held in Vienna from 20 to 31 August 1979, to formulate a common vision for the future contribution of science and technology for development.

18. In response to that request, the matter was discussed by a Commission on Science and Technology for Development panel, which held a brainstorming meeting at Geneva in December 1996. The panel identified the following four main themes as the basis for developing a common vision:

(a) The concrete impact of science and technology on development, generic and sectoral policies;

(b) Capacity-building in science and technology, including aspects relating to conceptualization, experiences, management and the examination of new opportunities;

(c) The interaction of private enterprises, Governments, academic institutions and civil society groups with science and technology for development;

(d) Assessment of international cooperation networks and the work of organizations active in the field of science and technology.

19. The first of the above four issues was discussed by members of the Commission and experts at a workshop organized in Jamaica prior to the third session of the Commission. Participants addressed a number of areas that were relevant in conceiving a common vision: concepts of development, the positive and negative aspects of science and technology, the relationship between science and technology and society. There was a general notion that a common vision would have to be a long-term concept with a minimum time-frame of one generation. It was stressed that an important element in finding useful applications for science and technology in a country is the ability to organize knowledge, to use data effectively and to make life more predictable for those at the poorer ends of society. At a time when Governments and civil society struggle to face the demands of global transformation, science and technology could be an important tool.

20. Participants viewed "knowledge" as a broad concept that included both codified and "tacit" knowledge. Science and technology was seen as incorporating not just the natural and physical sciences, but social sciences as well. A common vision for the future of science and technology would have to take such a comprehensive view and anticipate the goals to which innovation or learning should ultimately lead, for example, in terms of social development. Such a vision would be a shared responsibility of people and institutions. In that context, technology was not value-free, in particular in countries that could not afford to make more mistakes, and must be understood as context- and application-specific. At the global level, a common vision could create ideas and a framework for Governments and institutions of civil society to follow at the national level. It could mobilize cooperative efforts where they are most needed, for example in least developed countries. It should define the global "knowledge entitlements" and ways for making them reality. It could at the same time formulate guidelines for a science and technology policy useful for developing countries.

21. In discussing generic and sectoral aspects of science policy for development, participants identified a number of issues that could profitably be dealt with by a global forum, for instance, basic needs and science and technology, the gender dimension of science and technology, access to and the impact of information and communication technologies as well as biotechnology, management of science and technology, issues to be solved in relation to intellectual property rights, strengthening of capacities in developing countries, the role of public and private sectors, the diffusion of environmentally sound technologies, ethical issues and international relations and technology cooperation. It was considered that the results of analyses of general, inter-sectoral issues could profitably be made available within the United Nations system to more sector-oriented organizations such as the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the United Nations Industrial Organization (UNIDO).

22. At its third session, in May 1997, the Commission on Science and Technology for Development examined the results of the work undertaken with a view to formulating a common vision and suggestions were made concerning additional elements to be taken into account for the elaboration of such a vision. With regard to further modalities for the elaboration of the vision, in particular in the context of the twentieth anniversary of the Vienna Conference, different proposals were presented, including the discussion of a common vision at a global level, with a number of variations, such as the holding of a special session of the General Assembly or of the Commission on Science and Technology for Development. The holding of regional events, such as science and technology exhibitions, was also suggested, along with the preparation of a video on science and technology in relation to development, highlighting both positive and negative aspects. In the course of the discussion, the representative of UNESCO officially invited the Commission and the secretariat to participate in the preparations for the World Science Conference, to be held in 1999.

23. In the related resolution adopted by the Commission and endorsed by the Economic and Social Council in its resolution in 1997/62, it is recommended that the Commission, in the form of expert group meetings, carry out a programme of preparation, as outlined in the report of the meeting of the preparatory working group on that subject, held in December 1996 at Geneva, taking into account regional inputs.

Coalition of resources

24. In its resolution 1995/4, the Economic and Social Council recommended that the Commission on Science and Technology for Development's work at the international level on coalition of resources should focus on specific themes and common goals among recipients, donors and international financial institutions and also that the Commission should provide a forum for exchanging views

and for interaction among partners in different networks and coordination schemes in the area of science and technology for development. Such a forum could be held either as a segment of its biennial sessions or as an inter-sessional activity. In response to that request, the Commission decided to hold a meeting in late 1997 on the coalition of resources on information and communication technologies. The meeting, to be attended by members of the Commission, United Nations agencies and donor organizations, will examine a coalition of resources to finance in developing countries and countries with economies in transition:

(a) The applications of information and communications technologies in the area of health services, such as telemedicine (long-distance consultations, diagnosis and treatment), training, enabling access to the latest developments in health care and health-related research and development activities;

(b) The applications of information and communications technologies in education and learning in areas such as computer literacy, distance learning, distance teaching, development of competences at all levels of qualification, the training of trainers, the provision of hardware and the provision and development of educational software;

(c) The planning, building and operation of transmission infrastructure in developing countries and countries with economies in transition, to include such activities as the provision of Internet connectivity, development of local capacity for manufacturing both simple and advanced transmission-related equipment, design of a strategy for developing national transmission infrastructure and the financial requirements of postal administrations as autonomous market-oriented corporations.

25. The meeting will also examine the role and contributions of various key actors, including private business sector companies working in information and communications technologies; private banks/venture capital funds; public sector contributions (direct investments refocusing public funding, training, the provision of loans and the implementation of tax incentives and loan guarantee schemes); and tariffs/user fees, concessional bilateral aid, multilateral financing agencies, public-private partnership and other arrangements.

Coordination of science and technology for development

26. The Commission on Science and Technology for Development was given the task of coordinating the activities of the United Nations system in the area of science and technology for development and of making recommendations, if so required, on how the coordination and effectiveness of those activities could best be pursued. Pursuant to that mandate, the Commission took up the issue of coordination and cooperation in science and technology in the United Nations system at its first session, in April 1993. As a first step towards performing its coordination role, the Commission requested the Secretary-General to prepare a report for its second session on the progress achieved in coordination and cooperation of the science and technology activities of the United Nations system.

27. The subject of coordination and cooperation was taken up by the Economic and Social Council at its substantive session of July 1993. In that regard, the Council in its resolution 1993/71 requested the Secretary-General to prepare a report containing an analysis and action-oriented proposals for improving coordination mechanisms of the organs, programmes and agencies that are involved in the science and technology activities of the United Nations system.

28. Following its deliberations at its first session, the Commission pursued the objective of system-wide coordination in science and technology by involving agencies in its selected substantive themes during the inter-sessional periods. In the case of the first inter-sessional period (1993-1995), three substantive themes were selected by the Commission, namely, gender, science, technology and development; science and technology aspects of land management; and science and technology for meeting basic needs.

29. Organizations such as the International Labour Organization, the World Health Organization, the Food and Agriculture Organization of the United Nations, the International Fund for Agricultural Development, the United Nations Industrial Development Organization, UNESCO, the Economic Commission for Africa, the Economic and Social Commission for Asia and the Pacific, the United Nations Development Programme, UNU/Institute for New Technologies and the United Nations Environment Programme, among others, have contributed, in their own respective areas of competence, to the studies undertaken and reports prepared by the working groups set up for the three selected substantive themes and have also made inputs

to the preparation of the reports requested of the Secretary-General by the Commission on Science and Technology for Development and the Economic and Social Council. All the reports were presented to the Commission at its second session, in May 1995, when it, once again, took up the issue of coordination and cooperation, on the basis of the reports. While the existence of possibly overlapping mandates and programmes could not be excluded, the Commission considered, nonetheless, that the purpose of coordination should be to promote the complementarities of the various activities of the system while avoiding duplication as much as possible. That approach was adopted in undertaking work on the substantive theme chosen for the third inter-sessional period, namely, information and communications technologies. As mentioned in the preceding section on information and communications technology, several United Nations agencies contributed to the work of the Commission in the area. A synthesis report on the activities of the United Nations system in the area was prepared by UNCTAD.